Claims

1. (currently amended) A material comprising ribbons, fibrils or fibres, wherein ~~characterised in that~~ each of the ribbons, fibrils or fibres have an antiparallel arrangement of peptides in a β- sheet tape-like substructure.

2. (currently amended) ~~A~~ The material according to claim 1, wherein ~~characterised in that~~ the peptide is ~~selected from the group~~ P11-1, P11-2, P11-3, P11-4, P11-5, P11-6 ~~and~~ or P10-7.

3. (currently amended) ~~A~~ The material according to claim 1, wherein ~~characterised in that~~ the material comprises a self assembling peptide (SAP), wherein the SAP forms a tape in an aqueous medium and is made up of 3 or more polar/neutral amino acids and a plurality of charged amino acids.

4. (currently amended) ~~A~~ The material according to claim 3, wherein ~~characterised in that~~ the ratio of polar/neutral amino acids to charged amino acids is from 11:1 to 11:3.

5. (currently amended) ~~A~~ The material according to claim 3, wherein ~~characterised in that~~ the polar/neutral amino acids~~, which may be the same or different, and are selected from the group including~~ comprise glutamine, serine, asparagine, glutamic acid, orthinine, cysteine, lycine, histidine ~~and~~ or threonine.

6. (currently amended) ~~A~~ The material according to claim 3, wherein ~~characterised in that~~ the amino acids are positively charged and form a gel at a pH of less than or equal to a neutral pH.

7. (currently amended) ~~A~~ The material according to claim 3, wherein ~~characterised in that~~ the amino acids are negatively charged and form a gel at a pH of greater than or equal to a neutral pH.

8. (currently amended) ~~A~~ The material according to claim 3, wherein ~~characterised in that~~ the SAP is P11-1.

9. (currently amended) ~~A~~ The material according to claim 3, wherein ~~characterised in that~~ the amino acid chain is extended to include a bioactive peptide sequence.

10. (currently amended) ~~A~~ The material according to claim 3, wherein ~~characterised in that~~ the amino acid chain is attached to a therapeutically active molecule.

11. (currently amended) ~~A~~ The material according to claim 1, wherein ~~characterised in that~~ the material comprises an SAP which forms ribbons and/or fibrils in an aqueous solution and wherein the SAP has a primary structure in which at least 50% of the amino acids comprise an alternating structure of polar and apolar amino acids.

12. (currently amended) ~~A~~ The material according to claim 11, wherein ~~characterised in that~~ the polar amino acids include from 1 to 3 net charged amino acids per 11 amino acids.

13. (currently amended) ~~A~~ The material according to claim 12, wherein ~~characterised in that~~ the SAP is ~~selected from the group~~ P11-2, P11-3, P11-4 ~~and~~ or P11-5.

14. – 16. (canceled)

17. (currently amended) ~~A~~ The material according to claim 11, wherein ~~characterised in that~~ the material comprises a self assembling peptide (SAP) wherein the SAP forms a tape in an aqueous medium and is made up of 3 or more polar/neutral amino acids and a plurality of charged amino acids.

18. (canceled)

19. (currently amended) ~~A~~ The material according to claim 11, wherein ~~characterised in that~~ the apolar amino acids~~, which may be the same or different, and are selected from the group including~~ comprise phenylalanine, tryptophan, valine, leucine, isoleucine ~~and~~ or methionine.

20. (currently amended) ~~A~~ The material according to claim 17, wherein ~~characterised in that~~ the amino acid chain is extended to include a bioactive peptide sequence.

21. (currently amended) ~~A~~ The material according to claim 17, wherein ~~18 characterised in that~~ the amino acid chain is attached to a therapeutically active molecule.

22. (canceled)

23. (currently amended) ~~A~~ The material according to claim 11, wherein ~~characterised in that~~ the SAP is soluble in a highly ionic medium.

24. (currently amended) ~~A~~ The material according to claim 23, wherein ~~characterised in that~~ the SAP comprises a ratio of net charged amino acids to total amino acids of from 1:11 to 4:11.

25. – 27. (canceled)

28. (currently amended) ~~A~~ The material according to claim 3, wherein ~~1 characterised in that~~ the tapes are alternating peptide or complementary peptide tapes.

29. (currently amended) ~~A~~ The material according to claim 28, wherein ~~characterised in that~~ the complementary peptide tapes are made up of 3 or more polar amino acids of which some are charged amino acids wherein the ratio of charged amino acids to total amino acids is 3:11 or greater.

30. – 35. (canceled)

36. (currently amended) ~~A~~ The material according to claim 1, wherein ~~characterised in that~~ the persistence length of the ribbons, fibrils or fibres is from 20 nm - 70 μm.

37. (currently amended) ~~A~~ The material according to claim 36, wherein ~~characterised in that~~ the peptide is a P11-3 variant.

38. (currently amended) ~~A~~ The material according to claim 1, wherein ~~characterised in that~~ the material substantially comprises ribbons, fibrils, or fibres.

39. - 40. (cancelled)

41. (currently amended) ~~A~~ The material according to claim 38, wherein the material substantially comprises fibrils, and wherein ~~39 characterised in that~~ the fibrils are comprised in a network of fibrils interconnected at fibre-like junctions.

42. (currently amended) ~~A~~ The material according to claim 1, wherein ~~characterised in that~~ a solution of the material has a nematic transition occurring at $C_{I/N}$ = 0.9 mM.

43. (currently amended) ~~A~~ The material according to claim 38, wherein ~~claims 39 or 40 characterised in that~~ the fibrils or fibres are in the form of a nematic fluid.

44. (currently amended) ~~A~~ The material according to claim 43, wherein ~~characterised in that~~ the nematic fluid is an elastomeric gel.

45. (currently amended) ~~A~~ The material according to claim 1 , wherein ~~characterised in that~~ the material is in the form of a tissue engineering scaffold.

46. (currently amended) ~~A~~ The material according to claim 45, wherein ~~characterised in that~~ the scaffold is seeded with cells.

47. (currently amended) ~~A~~ The material according to claim 47, wherein ~~characterised in that~~ the cells ~~may be~~ are ligamentum cells for growing new ligaments, tenocytes for growing new tendon, chondrocytes for cartilage, osteoblasts for bone, cardiac cells for cardiac tissue engineering, stromal cells for tissue patches, fibroblasts and keratinocytes for skin and mesenchymal stem cells for any of these applications.

48. (currently amended) ~~A~~ The material according to claim 1, wherein ~~characterised in that~~ the material possess one or more of ~~the features selected from~~ high tensile strength at low weight, high modulus, high chemical resistance, high toughness, high cut resistance, low elongation to break, low thermal shrinkage, high dimensional stability, ~~and~~ flame resistant, or ~~and~~ self extinguishing.

49. (currently amended) ~~A~~ The material according to claim 1, wherein ~~characterised in that~~ the ~~processed~~ fibres possess characteristics selected from the following: continuous filament yarn, high tensile strength, processable on conventional looms, twisters, cord forming, stranding and serving equipment; staple, very high cut resistance, spun on conventional cotton or worsted spinning equipment, precision cut short fibres, processable on felting and spun lace equipment; pulp-wet and dry, floc, precision cut short fibres, high surface area, miscible in blend composites, thermal resistance, excellent friction and wear resistance; cord, high tensile strength and modulus at low specific weight, retention of physical properties at high and low temperature extremes, very low heat shrinkage, very low creep, good fatigue resistance; fabric, excellent ballistic performance at low weights; and excellent resistance to cuts and protrusion combined with comfortable wear and excellent friction and wear performance against other materials.

50. (currently amended) ~~A~~ The material according to claim 1, wherein ~~characterised in that~~ the material comprises a skin treatment.

51. (currently amended) ~~A~~ The material according to claim 50, wherein ~~characterised in that~~ the skin treatment comprises skincare and dermatological applications for cosmetic and/or medical treatment.

52. (currently amended) ~~A~~ The material according to claim 50, wherein ~~characterised in that~~ the skin treatment comprises one or more of skin protection, improvement in skin feel, improvement of skin strength, increased suppleness, delivery of active or beneficial substances, moisturisation, improved appearance and/or anti-ageing effects.

53. (currently amended) ~~A~~ The material according to claim 1, wherein ~~characterised in that~~ the material comprises a hair care product.

54. (currently amended) ~~A~~ The material according to claim 53, wherein ~~characterised in that the that~~ the hair care product ~~comprises a hair care to~~ improves hair condition, strength, feel, suppleness, appearance and/or moisturisation.

55. (currently amended) ~~A~~ The material according to claim 54, wherein ~~characterised in that the that~~ the hair care product comprises a hair shampoo, conditioner, dye, gel, mousse and/or other dressing.

56. (currently amended) ~~A~~ The material according to claim 1, wherein ~~characterised in that~~ the material comprises a network adapted for the delivery of perfumes, vitamins and/or other beneficial agents to the skin and/ or hair.

57. (currently amended) ~~A~~ The material according to claim 56, wherein ~~characterised in that~~ pH responsiveness is used to control ~~the~~ delivery ~~process~~.

58. (currently amended) ~~A~~ The material according to claim 1, wherein ~~characterised in that~~ the material is sterilised.

59. – 60. (canceled)

61. (currently amended) A method of tissue engineering, comprising seeding the material of claim 1 with cells ~~which comprises the use of a SAP as a scaffold~~.

62. (canceled)

63. (currently amended) ~~A~~ The method of ~~tissue engineering according to~~ claim 61, wherein the method is a method of ~~which comprises~~ bone repair.

64. – 68. (canceled)

69. (currently amended) A method of sterilising ~~a~~ the material according to claim 1, comprising ~~which comprises~~ gamma irradiation of a dry powder of the material.

70. (canceled)

71. (currently amended) The ~~use of a~~ material according to claim 1, wherein the material can modify ~~in the modification of the~~ wetting properties or anti-icing properties of a material, ~~for controlling the~~ control interaction of oil/water with clay surfaces, ~~the stabilising of~~ stabilize clay ~~itself~~, or deal~~ing~~ with fractures in oil-wells.

72. (currently amended) The ~~use of a~~ material according to claim 1, wherein the material is part of a sensor, biocatalyst or ~~in the manufacture of materials for use as sensors, as biocatalysts, or as~~ separation media in biotechnology applications.

73. (currently amended) The ~~use of a~~ material according to claim 1, wherein the material is part of a ~~in the manufacture of~~ bioresponsive and biocompatible surface~~s produced by adhesion, spreading and growth of endothelial cells in medical implant materials~~.

74. – 75. (canceled)

76. (currently amended) The ~~use of a~~ material according to claim 1, wherein the material can serve as a template for ~~the~~ nucleation and growth of inorganic materials.

77. - 80. (canceled)

81. (currently amended) The ~~use of a~~ material according to claim 1, wherein the material comprises ~~in the manufacture of a material selected from one or more of the following forms,~~ continuous filament yarns, staple, floc, cord, or ~~and~~ fabric.

82. – 95. (canceled)

96. (currently amended) ~~A scaffold constructed using a combination of~~ The material according to claim 1, further comprising a polymer ~~and other existing commercial and/or naturally occurring polymers~~.

97. - 99. (canceled)